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GB 2277029 A

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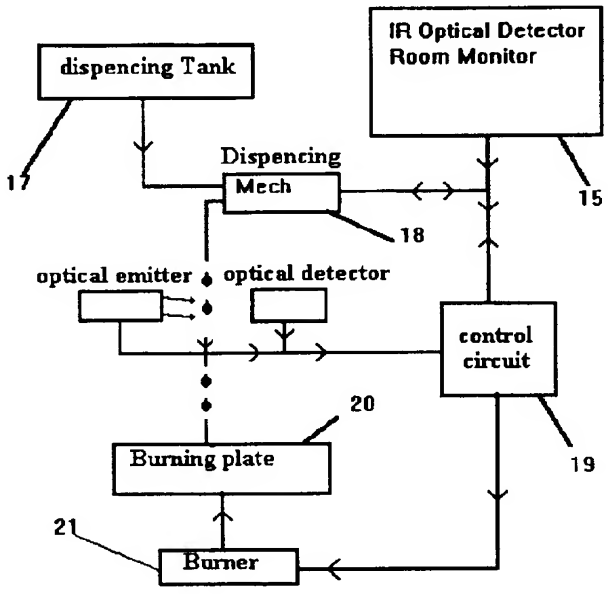
ONLINE: WPI, CLAIMS

(54) Optical detection and control system

(57) The atmosphere of a room contaminated by pollutants is controlled by detecting pollutants using an optical detector (15) and supplying aroma vapour to the room eg via the air conditioning, in response to the output signal from the detector. The atmosphere is continuously sampled and fed to the detector which measures the concentration level of selected pollutants and compares it with a predetermined threshold concentration. If pollution is detected, aroma material is dispensed from reservoir (17) to the burner unit (20, 21) and its supply is controlled by system (19) which may include a neural network circuit.

The system may be used to identify sick-building syndrome.

FIG 3 ELECTRONIC HEALTH SYSTEM



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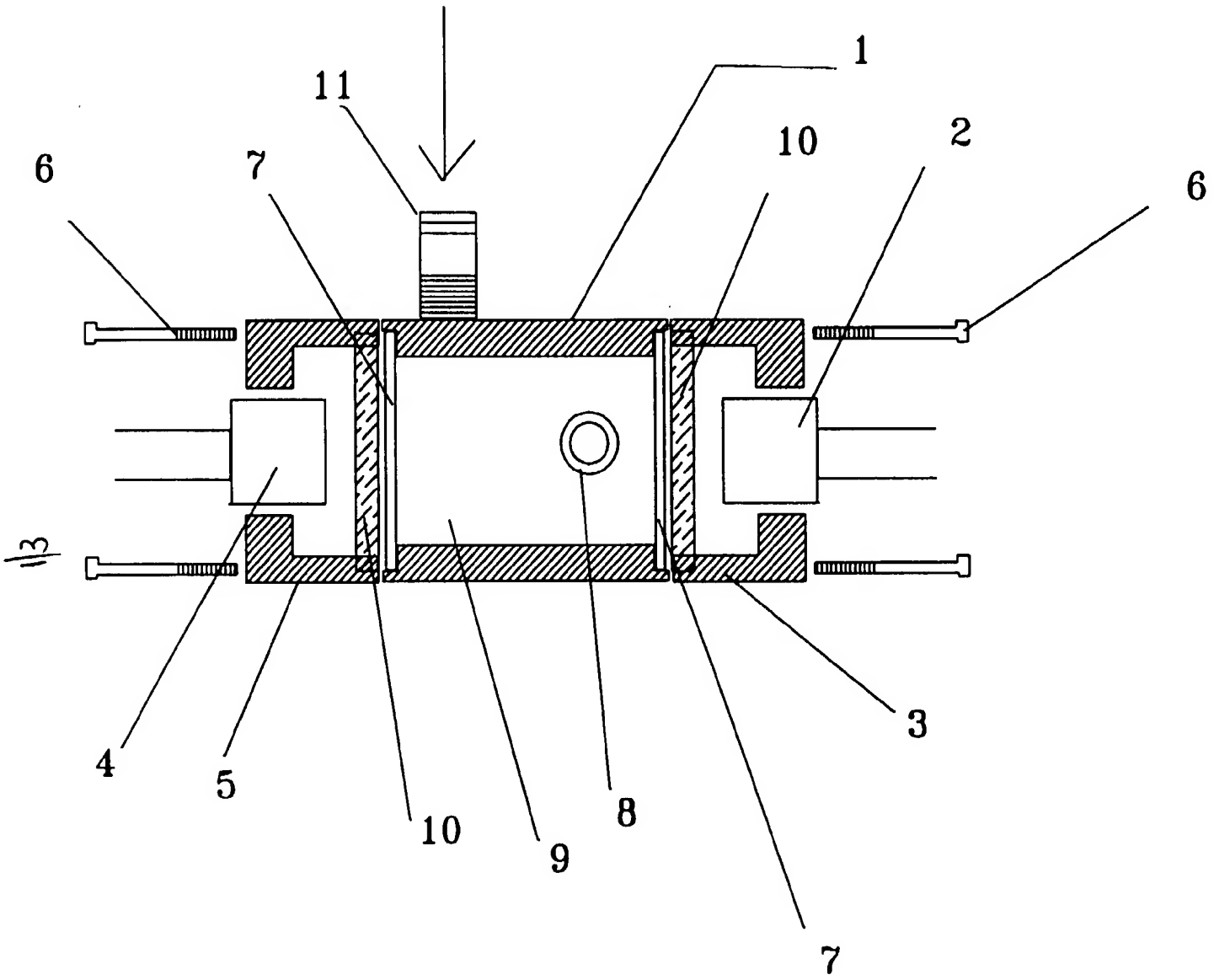


FIG 1 DETECTION UNIT

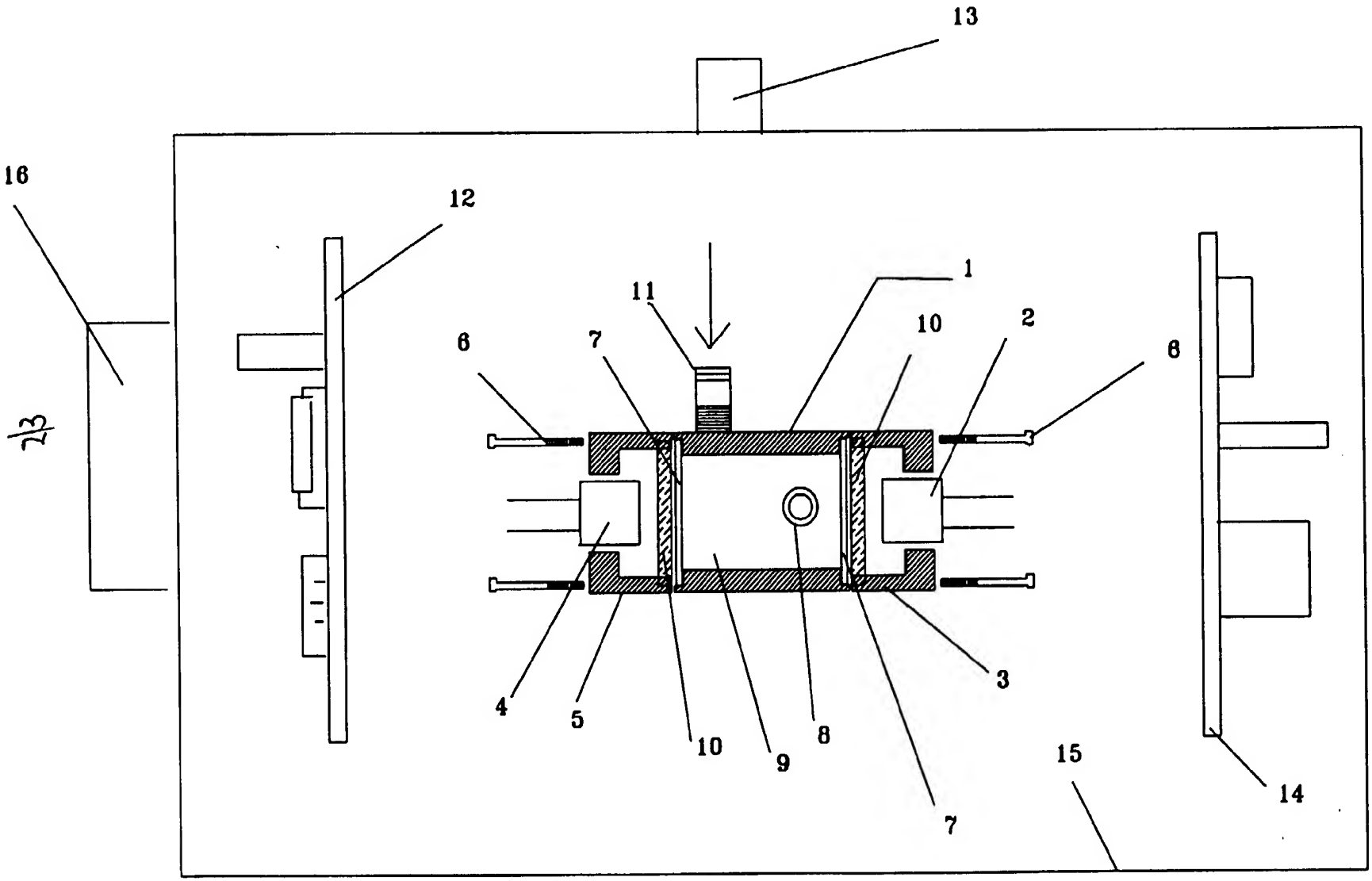
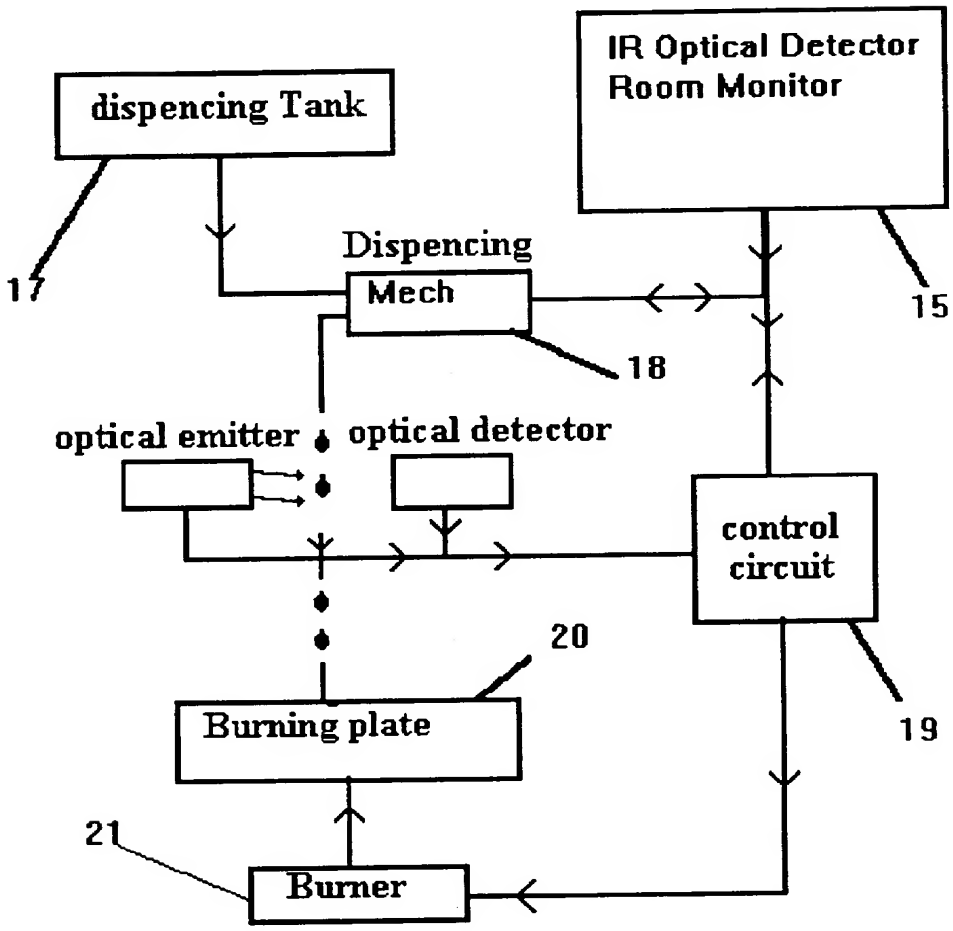


FIG 2 DETECTION SYSTEM

FIG 3 ELECTRONIC HEALTH SYSTEM



OPTICAL DETECTION AND CONTROL SYSTEM

RELATED APPLICATIONS

This application is a continuation-in-part of my co-pending application Ser. No. GB922153016:06 filed October 13, 1992, entitled "Electronic Health System".

The Electronic Health System (Self-Monitoring Room Aromatherapy) is rendered operative only when the pollution in the atmosphere of the room in which the system is installed is optically detected;

The system then, functioning using optical IR detection, will discharge aromatic vapour which produces environmentally-healthy conditions in the rooms, offices, industries and homes;

The system has an optoelectronic transducer which drives switches and solenoid valves to release the aromatic vapour through a burner;

When a polluted atmosphere is drafted into the sample chamber, the transducer then communicates an output signal to an electronic control circuit to start the process of defusing the aroma;

The detection system detects pollution by the amount of infrared radiation that the transducer absorbs at characteristic wavelengths. Infrared radiation at the characteristic absorption wavelengths of gases (selected by narrow band filters) is passed through the sample chamber;

The sample chamber operation consists of infrared transmission and detection in which the pollution (passed through it continuously) is measured based on recognising individual pollutants. The concentration-level of gases in the atmosphere is measured and compared to the threshold level of the system. The signal is proportional to the concentration-level of the gases in the room;

This process identifies the sick-building syndrome caused by the appropriate conditions which may exist in the office or in the environment;

CLAIMS

❶ (Fig 3). As an optical-detection and a control of a room's environment polluted with gases and chemicals (solids and liquids), an aroma is generated to modify the atmosphere of the room only when optical detection (15) detects the gases and chemicals, operating the burner circuit (21) to a set temperature: aroma material is dispensed from a reservoir (17) to the burner unit (20, 21), vaporising into the atmosphere an aroma, which diffuses via air duct, air conditioning etc. The air supply to the optical detector is by a fan-operated suction in which air flows continuously through the sampler chamber (9), and is monitored through the optical chamber (9) continuously. Its output signal is received by an electronic control (19) which starts the process of defusing aroma into the atmosphere;

❷ The optical detection in claim (1) measuring gases and chemicals in the atmosphere is characterised and in the wavelength of UV to IR;

Said detector comprises:

(A) A case (15), having detection system, mounted as a self-contained system; with pulse generator (12), source drive (12), source (4), sampling chamber, connections to the chamber (16), selectable filters (10) and detector (12), amplifying voltage output circuit, through a D type connector (16) mounted on the said housing;

(B) The source (4) gives an infrared wave electronically-pulsed over a duration set by the operator, a signal whose magnitude is appropriate to the appropriate detector. This source is housed in a metal-can TO5-type housing, with pins to the said electronic pulse generator, operating on an input voltage supplied by the pulse generator;

(C) The said pulse generator is operated by electrical supply, and produces signals of continuous operation at said wavelength and duration set by components to pulse the said source infrared device for a selected duration. The pulse generator is an adjustable emitter coupled multivibrator to provide low control-power. The said pulse width and amplitude is set by components in order to modify the frequency and duty factor of the source infrared;

(D) The said solid-state pulse-generating circuit pulses the said source and is connected to the said source;

(E) The sample chamber (9) has each end sealed by windows (7) to seal hermetically the said chamber from any unwanted turbulence and from external ambient conditions to the chamber. The connection (11) is to intake the polluted atmosphere and release it through exhaust connections (8). The propeller fan housed in said case will draw the pollution from the said chamber;

(F) The said source pulse-generator drive is connected to the said supply voltage of the main unit;

(G) The sampling chamber is made of such materials as metal, plastic, glass. Connection (13) is a supply-connection from the inside to the external case;

(H) Supply of liquid pollutant through the sampling chamber through the said connections is by pump action;

(I) The detector unit (Fig 1) is mounted at said position within said housing, with variable filter (10) to select mechanically the appropriate wavelength. The said filter is a combination of filters each for a specific wavelength and are set within the rotating wheel at a specific position in relation to the detector, the said detector position within the window. Selection is by rotation of either detector (2) or filters (10) around a common axis;

(J) The said filters are selectable to receive the said pulsed signals (10) of the said infrared wavelength;

(K) The said signal-response to the said pollution in the said chamber (9) is the said signal modified by the pollution and amplified, and the voltage output is received by the external control circuit;

(L) The said voltage output signal can be logarithmic or linear in relation to the absorption of the gases and chemicals within the said chamber (9). The said chamber (9) detects the concentration of the gases and chemicals and produces a voltage output to the said control circuit;

(M) The said detection system (Fig 2) is self-contained within a single housing (15), comprising of the said source, the said sample chamber, the said pulse generator circuit, the said detector, the said detector amplifying-circuit, the said connection, the said electrical connection to external power source;

❸ In combination with claims (1) and (2) above, the sampling chamber (9) is sealed by wide band windows (7) on each end to isolate the gases, chemicals and water pollutants from the said source (4) and the said detector (2). The said chamber (9) will have source path for the entrance of the gases, chemicals, water and air pollution (having a variable level of concentration) to be absorbed;

❹ In combination with claims (1), (2) and (3) above, the said sample chamber (9) forms the central section of the optical detection unit (fig 1); the said sample chamber (1) can be removed and cleaned; the said chamber has inlet (11) and outlet (13) connectors for solid, liquid and gaseous pollutants to enter; the said connectors allow the said pollution to enter on a continuous supply through the said chamber;

❺ In combination with claims (1, 2), the source unit (4, 5, 10, 6) is housed in metal or plastic type fittings (5) fitted to a housing of the same material as the said chamber (1). The said source (4) is push-fitted into the source housing (5); the said source housing (5) is fitted to the said chamber (1) by screw-fixing (6) to maintain the optical path; space is provided within the housing for a narrow-band optical filter (10);

❻ In addition to claims (1, 2, 5) wherein the said source (4) transmits infrared energy, the said source (4) will have a solid-state pulse-generator to drive the said source (4);

❼ In addition to claims (1) and (6), the therein said pulse generator (12) operates from voltage supply of 8 volt to 40 volt;

❽ In addition to claims (6) and (7), the output of the said source pulse-generating circuit (12) is a pulsed wave form;

❾ In addition to claims (1) and (2), wherein the said detection unit is housed (3) in the same material as the said sample chamber (1), the said detector unit (3) is screw-fixed to the said sample chamber (1), the said detector unit (3) having selectable filters (10) attached within the unit for selection of the said wavelength;

❿ In combination with claims above, the detection signal from the said optical detector system (fig 2) operates the control circuit (11) to initiate the said aroma-dispensing unit and burner unit;

❶❶ In combination with claims above, the detection system (fig 2) operates using absorportion characteristics and the non-dispersive measurement method;

❶❷ In combination with claims above, the control-system is an intelligent type with neural network circuit for analysing the incoming signals that pass through the said optical detection system; the signals are analysed by the neural network circuit for the identification of the types of pollution (solid, liquid or gaseous) which are present in the atmosphere;

❶❸ In combination with claims above, the neural network circuit would identify the appropriate concentrations of the said pollution in relation to the wavelength of each of the said pollutants.

Patents Act 1977 Examiner's report to the Comptroller under Section 17 (The Search report)	Application number GB 9405183.6
Relevant Technical Fields (i) UK Cl (Ed.O) A5G: GF; GV (ii) Int Cl (Ed.6) A61L: 9/02, 9/03, 9/04, 9/12; G01N 33/00	Search Examiner MRS S E CHALMERS Date of completion of Search 20 FEBRUARY 1996
Databases (see below) (i) UK Patent Office collections of GB, EP, WO and US patent specifications. (ii) ONLINE: WPI, CLAIMS	Documents considered relevant following a search in respect of Claims :- 1-13

Categories of documents

X:	Document indicating lack of novelty or of inventive step.	**P:**	Document published on or after the declared priority date but before the filing date of the present application.
Y:	Document indicating lack of inventive step if combined with one or more other documents of the same category.	**E:**	Patent document published on or after, but with priority date earlier than, the filing date of the present application.
A:	Document indicating technological background and/or state of the art.	**&:**	Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
E, X	GB 2277029 A (OPTOLINK) see claims	1-11

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).